FY-2001 PROPOSED SCOPE OF WORK for: **Project #:** 110
Channel Catfish Removal in Lower Yampa River

Lead Agency: U.S. Fish and Wildlife Service

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Category:
__ Ongoing project
__ Ongoing-revised project
__ Requested new projects
x Unsolicited proposals

Expected Funding Source:
x Annual funds
__ Capital funds
__ Other (explain)

I. Title of Proposal: Removal of Channel Catfish from the lower Yampa River.

II. Relationship to RIPRAP:

Green River Action Plan: Yampa and Little Snake Rivers
III.A.1.d. Nonnative fish removal in Yampa Canyon

III. Study Background/Rationale and hypothesis:

Nonnative fishes have become established in the Upper Colorado River Basin. These fishes are believed to displace, compete with, prey on, and hybridize with native fishes. Because many nonnative fishes are adapted to the modified Colorado River Basin landscape (i.e., changes in natural flows, temperatures, etc., following construction of main stem reservoirs), they will be impossible to eliminate from the system. In a questionnaire to researchers, channel catfish were considered to pose the greatest threat to native fishes in the Upper Colorado River Basin (Hawkins and Nesler 1991). Channel catfish was also identified in a RIP sponsored nonnative workshop as the principal predator and competitor affecting humpback chub in the Upper Colorado River Basin (Tyus and Saunders 1996) and have been suggested as a major factor in the decline of humpback chub in the Yampa River (Tyus 1998). In addition, nonnative fish control (i.e., northern pike and channel catfish) is included in the Yampa Management Plan Cooperative Agreement as a requirement for future water development in the Yampa Valley.

Channel catfish are found in low to moderate gradient rivers with sandy, gravel or boulder substrates (McMahan and Terrell 1982). Young catfish congregate in riffles or shallow pools, whereas, adults prefer both runs and pools (Aadland 1993). In Yampa Canyon, channel catfish were most abundant in turbulent areas associated with large substrate (Tyus and Nikirk 1988). They spawn in early spring through early summer when water temperatures

range between 21 and 29^{0}C (summary in Lentsch et al. 1996). Although spawning adults can migrate long distances in search of suitable spawning sites (Carlander 1969), channel catfish telemetry studies in the Yampa River showed that most fish observed remained in the same river reaches throughout the year (Irving and Karp 1995, Modde et al. 1999). Sedentary behavior is essential for removal efforts to be effective.

The goal of the RIP nonnative fish control program in the Upper Colorado River Basin is to reduce the adverse impacts of nonnative fishes on endangered fishes. A strategic plan for nonnative fish removal was developed by the RIP that identified implementing preventive measures and developing an active control program (Tyus and Saunders 1996). Although initial channel catfish removal efforts in the mainstem Green River was judged ineffective in reducing catfish numbers (Badame, et al. 1999), similar efforts in smaller tributaries with lower baseflows may be more effective. Channel catfish removal in the Yampa River during 1999 showed density reductions of approximately 50% of the catfish population in three of four experimental removal reaches based on catch per unit effort data (Figure 1 and 2, data from Fuller and Modde 2000). The latter study identified the most effective methods, and presented a strategy that would be effective in reducing the number of channel catfish in the Yampa River below Deerlodge.

The purpose of this study is to reduce the channel catfish population in the lower Yampa River to reduce the competitive and predatory impacts of nonnative fishes on growth, recruitment and survival of the resident population of humpback chub. A population (or relative abundance) estimate will be determined for humpback chub in 2000, and according to the RIP program directors proposal another estimate is scheduled for 2003. This would coincide with the end of the removal effort and will offer a good opportunity to measure any response in humpback chub population to channel catfish removal.

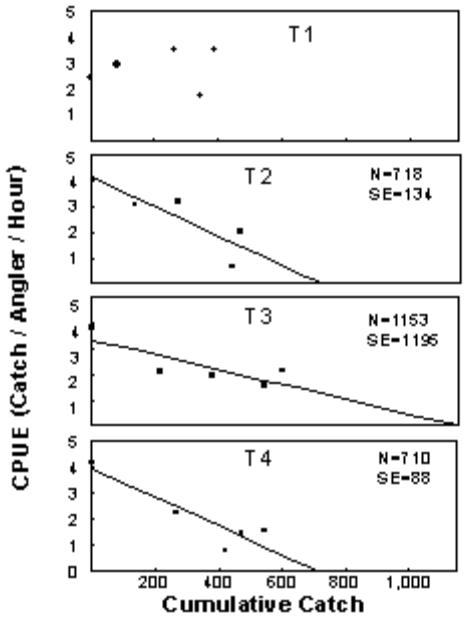

Figure 1. Reduction of channel catfish from the Yampa River within Dinosaur National Monument during 1999 by treatment reach (T). Estimated population size per treatment reach (N=) was calculated using a depletion estimator. Higher reach numbers are furthest downstream. (data from Fuller and Modde 2000)

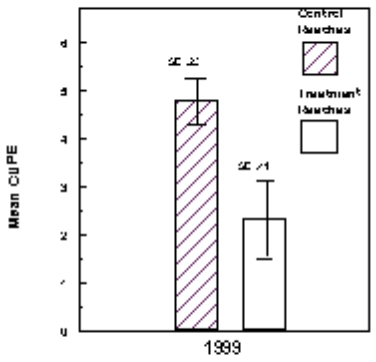

Figure 2. Comparison of mean catch per hour of channel catfish in removal treatment reaches with control reaches in the lower Yampa River in 1999.

I. Study Goals, Objectives, End Product: The goal of this study is to reduce predatory and competitive impacts of channel catfish on humpback chub and possibly competitive interactions with Colorado pikeminnow in the lower Yampa River. The specific purpose of the study is reduce the numbers of channel catfish in the lower Yampa River and monitor whether a positive response in the local humpback chub population can be detected. The study objectives are:

1. remove half of the existing numbers of channel catfish throughout the lower Yampa River (river miles 10-46) occupied by humpback chub, and
2. summarize and document the reduction of channel catfish removed from the lower Yampa River over a two year period.

V. Study area: The primary study areas will include the Yampa River from just below Laddie Park (rm 10) to Deerlodge Park (rm 46). This section of the Yampa River is within the boundary of Dinosaur National Monument and subject to National Park Service operating regulations. No access is available to the river between Deerlodge, Colorado and Echo Park (confluence of the Green and Yampa rivers).

VI. Study Methods/Approach:

This study proposes to remove channel catfish throughout the lower Yampa River (river miles 47 to 10 (previous study and the geomorphology suggest that few channel catfish are found between river mile 10 and warm springs rapid, i.e., river mile 4), rather than experimental removal reaches as reported by Fuller and Modde (2000). The design will stratify the lower Yampa River into 8 removal sections (Table 1) to facilitate comparison of removal efficiency. Below Warm Springs Rapid, fish composition in the Yampa River is highly influenced by the Green River at Echo Park.

Table 1. Location and length of catfish removal reaches (RM = river mile) in the lower Yampa River.

Reach No.	Beginning RM	Ending RM	Length
Reach 1	45	40.9	4.1
Reach 2	40.9	36.8	4.1
Reach 3	36.8	32.4	4.4
Reach 4	32.4	28.0	4.4
Reach 5	28.0	24.0	4.0
Reach 6	24.0	20.0	4.0
Reach 7	20.0	15	5
Reach 8	15.0	10.0	5

Removal methodology will consist of angling. Fuller and Modde (2000) compared multiple methods including several passive and active gear types and angling (using 10 to 20 anglers per trip) was the most effective means of removing channel catfish per trip. Removal trips will be conducted through the summer baseflow period (>1,500 cfs), when catfish are confined to a lesser area to facilitate removal (between July and September). Catfish will be removed during four passes through each reach. Therefore, catfish will be removed from thirty-two reaches through the summer baseflow period (8 reaches x 4 removals). Groups of between ten and twenty volunteers per trip (depending on availability) will remove channel catfish from four reaches per trip during a five day period. Therefore, two trips will be required to remove catfish from all eight reaches between Deerlodge (rm 46) and Laddie Park (~rm 10), necessitating eight removal trips. Specific reaches sampled per trip will be determined randomly so that trip-specific effects will be distributed randomly.

Catfish will be removed by angling with bait (the most effective method described by Fuller and Modde 2000). Each volunteer group will be supervised by Fish and Wildlife staff who will direct location of angling activity and provide logistical support to the anglers (i.e., bait, raft transportation, meals, and camp logistics). Angler activity will be directed to allow complete coverage within and among reaches. Each angler will be provided data sheets. Time and location angled, and numbers and length of fish removed will be recorded by each angler. Catfish captured will be disposed of according to specifications dictated by Dinosaur National Monument. Fish and Wildlife Service staff will collect angler data sheets daily. Fish and Wildlife Service staff will subsample length and weight data to determine the size structure of fish removed. Estimates of weight, together with size and removal numbers will be used to calculated total biomass of channel catfish removed. The importance of accurate and consistent data recording will be emphasized to volunteers during a pre-trip meeting, and Fish and Wildlife staff will collect review data sheets daily to insure that all data is entered. The pre-trip meeting will consist of an orientation to the purpose of the removal effort, description of the sampling protocol (i.e., work expectations, review of data sheet, need to throughly sample each designated area, need to keep accurate data, etc.,)

Total numbers of catfish removed and catch per unit of effort will be determined for each reach per trip. The experimental unit will consist of the average number of channel catfish captured per angler per hour per reach per trip. A maximum likelihood depletion estimator (CAPTURE) will be used to calculate catfish population size for each reach per year of the study to track the effectiveness of removal efforts. The final report will summarize the biomass estimates and numbers of channel catfish removed from the Yampa River, determine if differences occurred between numbers removed among reaches, track the decrease in channel catfish for two consecutive years (plus compare removal efforts with those in 1998-99), determine any changes in size structure associated with removal, and determine the percent of catfish removed.

All endangered fish will be PIT tagged and immediately returned to the river.

VII. Task Description and Schedule:

Task 1: Remove channel catfish from the lower Yampa River.

Task 2: Summarize data and determine the rate of channel catfish removal from the lower Yampa River following the FY2001 and FY2002 removal efforts. Estimate population size of channel catfish in the lower Yampa River and track reduction of catfish in eight river reaches between Laddie and Deerlodge parks (rm 10-46) in August and September 2002 and 2003..

VIII. FY-2001 Work: Deliverables - Annual Report December 15, 2001, Final Report March 2004

Budget Estimates:

Task	Purpose	2001	2002	2003
1	Permanent Labor	$26,588	$27,918	
	Seasonal Labor	$24,222	$25,435	
	Equip. and Supplies	$27,000	$22,345	
	Travel	$3,840	$4,032	
	Subtotal	$81,650	$79,730	
2	Permanent Labor	$19,016	$19,815	$15,000
	Seasonal Labor	$764	$802	
	Equip. and Supplies	$850	$735	$2,000
	Travel	$640	$672	$3,000
	Subtotal	$21,270	$22,025	$20,000
	Grand Total	$102,920	$101,755	$20,000

IX. Budget Summary (Does not include overhead):

FY 2001 $102,920
FY 2002 $101,755
FY 2003 $20,000

X. Reviewers:

T. Nesler, R. Valdez, K. Christopherson

XI. References:

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